

How has the Long Island Sound Seafloor Changed Over Time?

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The Long Island Sound (LIS) is a result of several centuries of glaciation and sea level variation. The area is being hit by large storms such as hurricane sandy, and could face potential changes to the seafloor and coastal morphology due to the impending threats of climate change. Today the LIS is an important ecosystem that provides a critical habitat to numerous plant and animal species, and is important to the stability of several economies including fishing, boating, and tourism. Determining where erosion, transportation and deposition of sediment is occurring is important for sustainable development in and around the sound. Calculating the rate of change of the seafloor, identifying the hot spots where the most change is occurring, and determining which processes impact the scale of change are important for preserving the economy and ecology that depend on the sound. This is especially true as larger and more frequent storms are anticipated due to climate change. We used older bathymetric data (collected 1990-2001 by the National Oceanic and Atmospheric Administration) and compared those with the more recently collected LIS bathymetric data where these exist (collected 2012-2014 by a collaborative LIS mapping project with NOAA, the States of New York and Connecticut). Using GIS (Geographic Information Systems) we analyzed and mapped the differences between these two datasets to determine where and by how much the seafloor has changed. The results show observable changes in the LIS seafloor over time, but the scale and causes of this movement depends on the area observed. The five areas of the sound that had data from 1990-2001 and 2012-2014 were selected to highlight key processes that may have caused observable changes on the seafloor. Changes were observed in tidal inlets, areas with existing morphology and near shore sediment transport. Changes were also observed in the form of migrating dunes on the seafloor. The changes in depth observed were on the scale of 1-2 meters in all five areas of study. The rates of change observed depended on the area of the sound, as each area had different factors to account for that impacted sediment transport. For example, the sediment moved horizontally 78.14 meters in the coastal inlet between 1990 and 2012, whereas one of the dunes moved horizontally 27.33 meters from 2001-2013.